

REMARKS

Claims 1-19 are pending in this application. Claims 1-19 stand rejected. Reconsideration and further examination of the subject patent application in light of the present Amendment and Remarks is respectfully requested.

Rejections Under 35 U.S.C. §112

Claims 1-19 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

“Claim 1 recites "flat sensing and counter electrodes arranged in a mutually parallel arrangement" which is not supported by the originally filed specification. It appears that the Applicant relies on figure 2 for support of the above amendment; however, the originally filed specification does not disclose that figure shows the sensing and counter electrodes are arranged in mutually parallel arrangement. Furthermore, the limitation "each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes" is not supported by the originally filed specification for the same reasons stated above.” (Office Action of 9/28/11, page 2).

The Examiner contention that “the originally filed specification does not ... disclose that figure 2 shows the sensing and counter electrodes are arranged in mutually parallel arrangement” is inapposite. For example, as would be well known to those of skill in the art, the figures are part of the specification. As such, the Applicant is entitled to claim anything disclosed in the specification whether explicitly disclosed within the text or simply shown in the figures.

In this regard, FIG. 2 shows “relatively flat sensing and counter electrodes arranged in a mutually parallel arrangement.” Since FIG. 2 clearly shows this feature, this claim element clearly complies with 35 U.S.C. §112, first paragraph.

The Examiner's contention that "each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes" is not supported by the originally filed specification" is unsupported for the same reasons. FIG. 2 of the Application clearly shows a perspective view of "each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes." Since FIG. 2 clearly shows this feature, this claim element clearly complies with 35 U.S.C. §112, first paragraph.

Since FIG. 2 of the Application shows the "relatively flat sensing and counter electrodes arranged in a mutually parallel arrangement" and the context where "each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes", the rejections are improper. Since the rejections are improper, they should be withdrawn.

The Office Action asserts that

"With regard to Applicant's argument about the 35 USC 112, first paragraph rejections of claims 1-19, the arguments are not persuasive. Firstly, the originally filed specification silent regarding whether the sensor depicted in figure 2 is the actual practical construction of the sensor. It is further evidenced by the fact that figure 2 is an exploded view of the sensor and not the assembled sensor" (Office Action of 9/28/11, paragraph bridging page 12)

However, this allegation is inapposite. If the Examiner feels that there is reason to believe that the sensor of FIG. 2 is not the actual practical construction of the claimed sensor, then it is respectfully requested that the Examiner put into evidence his reasons for raising this issue. If the Examiner is not willing to do so, then it must be concluded

that these allegations are speculation that has no probative value whatsoever and are not entitled to any evidentiary weight whatsoever.

On another level, FIG. 6 does show the assembled sensor of FIG. 3 without the detail of FIG. 3. If the Examiner feels that there is some reason to conclude that the assembled sensor of FIG. 6 would be somehow different than the exploded view of FIG. 3, then the Examiner is invited to put into evidence the basis of such conclusions. If the Examiner is not willing to do so, then it must be concluded that these allegations are speculation that have no probative value whatsoever and are not entitled to any evidentiary weight whatsoever.

The Office Action asserts that

“Secondly, the reference electrode 6, the separator 13 and the porous glass wool separator 15 are disposed between the counter electrode and the sensing electrode; thus, in the assembled gas sensor, the height of the reference electrode 6, the separator 13 and especially the porous glass wool separator 15, which can compress due to the applied pressure, would cause either the counter electrode and the sensing, electrode to tilt. Therefore, it is unclear from just the exploded view of the gas sensor and without any explicit teaching from the originally filed specification that the limitation, which requires the sensing and counter electrodes are arranged in a mutually parallel arrangement when the gas sensor is assembled, is supported by the originally filed specification. Likewise, without explicit teaching from the originally filed specification, it is unclear whether the assembled gas sensor would have the limitation "each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes". Hence, Examiner maintains the position that claims 1-19 contain new matters that are not supported by the originally filed specification” (Office Action of 9/28/11, paragraph bridging pages 12-13).

However, these allegations (once more) amount to nothing more than speculation. For example, how much compression does the Examiner assume exists within the finished sensor in order to

cause the sensing electrode to tilt? Are these based upon calculations made by the Examiner? If the Examiner feels that there is some reason to conclude that the assembled sensor of FIG. 6 would be somehow different than the exploded view of FIG. 3, then the Examiner is invited to put into evidence the basis of such conclusions. If the Examiner is not willing to do so, then it must be concluded that these allegations are mere speculation that have no probative value whatsoever and are not entitled to any evidentiary weight whatsoever.

Stated differently, FIGs. 3 and 6 (in combination) show “a housing; relatively flat sensing and counter electrodes within the housing, the relatively flat sensing and counter electrodes arranged in a mutually parallel arrangement and in contact with a liquid electrolyte; a plurality of connection apertures arranged in a row extending along a wall of the housing directly adjacent corresponding edges of the sensing and counter electrodes.” As such, the rejections are improper and should be withdrawn.

Rejections Under 35 U.S.C. §103

Claims 1-8, 10-15, 17, and 19 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 5,298,146 to Braden et al. in view of U.S. Pat. No. 4,522,406 to Tabata et al., U.S. Pat. No. 4,948,496 to Chand and U.S. Pat. No. 4,522,899 to Illman et al. Applicant respectfully traverses these rejections.

In response, claim 1 has been clarified by being further directed to “a plurality of connection apertures arranged in a row extending along a wall of the housing directly adjacent corresponding edges of the sensing and counter electrodes.” Independent claims 13 and 17 have been similarly clarified. The row of apertures 12a-c are shown in FIG. 2 of the specification. In

order to further prosecution, the applicant also hereby offers to amend the specification to incorporate this feature into the written description.

With regard to claims 1-8, 10-15, 17 and 19, it appears that these claims are clearly differentiated over Braden et al., Tabata et al., Chand and Illmann et al. and the combination of Braden et al., Tabata et al., Chand and Illmann et al. More specifically, the combination fails to disclose the features of claims 1-8, 10-15, 17 and 19.

In this regard, the Office Action asserts that

“Braden discloses ...

A plurality of connection apertures in a wall of the housing directly adjacent corresponding edges of the sensing and counter electrodes (figure 2, the connections 16-20 extend from the electrodes to the outside through the wall of the housing 13; therefore, it is the Examiner's position that the wall of the housing has a plurality of connection apertures having bores directly adjacent to the corresponding edges of the electrodes in order for the connections 16-20 to extend to the outside),

The current collector further comprising:

A plurality of relatively straight collectors (16-20), each of the plurality of current collectors extending through a respective connection aperture of the plurality of with an end of each trapped against and in direct contact with one of the sensor's electrodes (figure 2).

In figure 2, Braden at the least suggests that the flat sensing and counter electrodes arranged in mutually parallel arrangement and the each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes. However, lacking explicit disclosure from the specification, Braden is silent regarding the flat sensing and counter electrodes arranged in a mutually parallel arrangement, the current collectors are flexible metal current collectors, each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes and a compliant seal of a thermoplastic elastomeric material is inserted into one of the connection apertures and the configuration of the flexible current collector and the compliant seal as required by claim 1. At the time of the invention, one with ordinary skill in the art would have found it obvious to modify gas sensor of Braden to have the flat sensing and counter electrodes in mutually parallel arrangement and each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes because absent persuasive evidence that the claimed mutually parallel arrangement of the flat sensing and counter electrodes as well as each of the plurality of current collectors extending-through -a-respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes are

significant, changes in shape is a matter of obviousness in light of Braden's clear suggestion of the mutually parallel arrangement of the flat sensing and counter electrodes as well as each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes" (Office Action of 9/28/11, paragraphs beginning on page 3 and continuing to page 5).

However, these contentions are unsupported on a number of levels. For example, FIG. 2 of Braden et al. is a simplified view of a multi-electrode sensor. A person of average skill in the art would know that FIG. 2 is a simplified view (rather than a cut-away view) because of the absence of detail for many of the elements the multi-electrode sensor of FIG. 2. For example, the case 1 is shown in outline form. One would know that the case is shown in outline form because the aperture at the top of the case 1 doesn't show a rear wall which would be the case if FIG. 2 were simply a cut-away view.

Similarly, the connections 16, 17 and supply leads 19, 20 of Braden et al are also shown in simplified form. One would know that the connections 16, 17 and supply leads 19, 20 are in simplified form because leads 16, 17, 19, 20 are shown as a continuous heavy line extending from outside the case 1 to the electrodes 14, 15, 18. However, those of skill in the art would recognize that the relatively thin collector wire ("0.1 mm/100 micron" (specification, par. [0058])) that is typically used for making contact with the electrodes 15, 15, 18 would not be suitable for making contact with external sensing circuits (see e.g., par. [0015] of the specification).

Those of skill in the art would also notice that the heavy lines 16, 17, 19, 20 of FIG. 2 of Braden et al. are shown as extending over the outline of the housing 1 rather than being shown as broken by the wall of the case 1. Since the leads 16, 17, 19, 20 of FIG. 2 of Braden et al. extend over (rather than through) the case 1, no apertures are shown in the housing 1 for the leads 16,

17, 19, 20 in FIG. 2 of Braden et al. Since there are no apertures shown in FIG. 2, Braden et al. provides no teaching at all with regard to apertures, leads or to the arrangement of any leads that penetrate the housing of the Braden et al. electrochemical sensor.

On another level, Braden et al. does not show the “plurality of connection apertures in a row through a wall of the housing directly adjacent corresponding edges of the sensing and counter electrodes” (claim 1, lines 4-5). In this regard, placing the apertures 12a-c in a row facilitates the mutually parallel nature of the current collectors and electrodes. As described in paragraphs 70-72 of the specification, the mutual parallel arrangement of current collectors and electrodes allows for the machine assembly of sensors and for the much smaller construction of such devices because of the stabilizing of the current collectors within the apertures during assembly. This is not possible under Braden et al.

Similarly, Tabata et al. is merely directed to a waterproof seal for a connector. Tabata et al. also provides no teaching at all with regard to the placement of apertures or the orientation of current collectors that penetrate the electrochemical sensor.

Similarly, Illman et al. is merely directed to sealing materials. Illman et al. also provides no teaching at all with regard to the placement of apertures or the orientation of current collectors within an electrochemical sensor.

Similarly, Chand shows an electrochemical gas sensor that uses a complex series of bends to route current collectors to a destination of use. Chand provides no teaching at all with regard to the placement of apertures or the orientation of current collectors within an electrochemical sensor.

In general, the claimed “plurality of relatively straight, flexible, metal current collectors, each of the plurality of current collectors extending ... parallel to the mutually parallel sensing

and counter electrodes with an end of each trapped against and in direct contact with one of the sensor's electrodes" offer a functionality not available in prior art sensors because the parallel entry point allows the current collectors to enter the housing proximate the edge of the electrodes and for the current collectors to be much shorter than has previously been the case. The fact that the collectors are straight allows the collectors to flex along their length rather than to follow a complex route that concentrates bending forces into small portions of that route.

Moreover, the claimed invention solves the difficult problem of making connections between the electrodes and current collectors by trapping the current collectors against the electrodes. Braden et al. and Chand rely upon a connection structure that would have to be separately created. In contrast, Tabata et al. and Illman et al. have nothing to do with electrochemical sensors and fail to provide any teaching in this regard.

As such, Braden et al., Tabata et al., Chand and Illman et al. and the combination of Braden et al., Tabata et al., Chand and Illman et al. fail to teach or suggest each and every claim limitation. Since the combination fails to teach or suggest each and every claim limitation, the rejections are improper and should be withdrawn.

Claim 9 stands rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 5,298,146 to Braden et al. in view of U.S. Pat. No. 5,667,406 to Tabata et al., U.S. Pat. No. 4,948,496 to Chand and U.S. Pat. No. 4,522,899 to Illman et al. and U.S. Pat. No. 5,224,875 to Watanabe et al. Applicant respectfully traverses these rejections.

However, claim 9 is dependent upon claim 1 and includes all of the limitations of claim 1. As such, claim 9 is also directed to "a plurality of relatively straight, flexible, metal current collectors, each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter

electrodes with an end trapped against and in direct contact with one of the sensor's electrodes and a compliant seal of a thermoplastic material over-molded directly onto the flexible, metal current collector, the compliant seal inserted into the one of the connection apertures.”

It may be noted next that Watanabe et al. also requires a mechanical connection between the wire C and water sealing plug B. The Watanabe water sealing plug is made of soft rubber and fits over preexisting insulation on a wire.

As such, Branden et al., Tabata et al., Chand, Illman and Watanabe et al. and the combination of Branden et al., Tabata et al., Chand, Illman et al. and Watanabe et al. fail to teach or suggest each and every claim limitation. Since the combination fails to teach or suggest each and every claim limitation, the rejections are improper and should be withdrawn.

Claims 16 and 18 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 5,298,146 to Braden in view of U.S. Pat. No. 5,667,406 to Tabata et al., U.S. Pat. No. 4,948,496 to Chand and U.S. Pat. No. 4,522,899 to Illman et al. and U.S. Pat. No. 6,638,107 to Silberberg. Applicant respectfully traverses these rejections.

It may be noted first in this regard that claims 16 and 18 are dependent upon claim 1 and includes all of the limitations of claim 1. As such, claims 16 and 18 are also directed to “a plurality of relatively straight, flexible, metal current collectors, each of the plurality of current collectors extending through a respective connection aperture of the plurality of apertures parallel to the mutually parallel sensing and counter electrodes with an end trapped against and in direct contact with one of the sensor's electrodes and a compliant seal of a thermoplastic material over-molded directly onto the flexible, metal current collector, the compliant seal inserted into the one of the connection apertures.”

It may be noted next that Silberberg (as with Branden et al., Tabata et al., Chand and Illman et al.) fails to provide any teaching or suggest of these features. Silberberg, in fact, is merely directed to cable coupling devices.

As such, Branden et al., Tabata et al., Chand, Illman et al. and Silberberg and the combination of Branden et al., Tabata et al., Chand, Illman et al. and Silberberg fail to teach or suggest each and every claim limitation. Since the combination fails to teach or suggest each and every claim limitation, the rejections are improper and should be withdrawn.

Closing Remarks

For the foregoing reasons, applicant submits that the subject application is in condition for allowance and earnestly solicits an early Notice of Allowance. Should the Primary Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, the Primary Examiner is respectfully requested to call the undersigned at the below-listed number.

The Commissioner is hereby authorized to charge any additional fee which may be required for this application under 37 C.F.R. §§ 1.16-1.18, including but not limited to the issue fee, or credit any overpayment, to Deposit Account No. 23-0920. Should no proper amount be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal, or even entirely missing, the Commissioner is authorized to charge the

Appl. No. 10/566,867

unpaid amount to Deposit Account No. 23-0920. *(If filed by paper, a duplicate copy of this sheet(s) is enclosed).*

Respectfully submitted,

HUSCH BLACKWELL LLP

By: 

Jon P. Christensen
Registration No. 34,137

Paul M. Vargo
Registration No. 29,116

Dated: November 30, 2011
HUSCH BLACKWELL LLP
120 South Riverside Plaza, Suite 2200
Chicago, Illinois 60606
(312) 655-1500